RC-6000

MULTIBAND P25 AIRBORNE TRANSCEIVER REMOTE CONTROL

Installation and Operating Instructions

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REVISION HISTORY
[02RE299]

REV	SECTION - PAGE -	DESCRIPTION	DATE	Edited by
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Rev A Issue 3	Global	New Document template No text information/drawings changed Title Page layout changed Revision History page added Added Headers/Footers Warranty Page added		
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INFORMATION NOTES

ESD CAUTION

This unit contains static sensitive devices. Wear a grounded wrist strap and/or conductive gloves when handling printed circuit boards.

FCC COMPLIANCE INFORMATION

WARNING: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING

Changes or modifications not expressly approved by Technisonic Industries could void the user's authority to operate the equipment.

WARRANTY INFORMATION

The Model RC-6000 Remote Control is under warranty for one year from date of purchase.
Failed units caused by defective parts, or workmanship should be returned to:

Technisonic Industries Limited
240 Traders Boulevard
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DO-160C Summary

Summary of DO-160C Environmental Qualifications for the Technisonic Model RC-6000, Remote Control Head for the Model TDFM-600 and 6000 Transceiver.

CONDITIONS	SECTION	DESCRIPTION OF CONDUCTED TESTS
Temperature and Altitude	4.0	Equipment qualified to categories C4 and D1.
Vibration	8.0	Equipment is qualified without shock mounts to categories B, M and N.
Magnetic Effect	15.0	Equipment is class Z.
Power Input	16.0	Equipment qualified to category B.
Voltage Spike	17.0	Equipment qualified to category B.
RF Emission	21.0	Equipment qualified to category Z.

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SECTION 1 - GENERAL DESCRIPTION

1.1 INTRODUCTION

This publication provides operating and installation information on the RC-6000 remote control.

1.2 DESCRIPTION

The RC-6000 is designed to be a remote control head for the TDFM-600/6000 series of airborne transceivers. It is a secondary (slave) control point and is not intended to replace the function of the front panel of the radio.

1.3 TECHNICAL CHARACTERISTICS

SPECIFICATION	CHARACTERISTIC
Model Designation:	RC-6000
Physical Dimensions:	Approx. 5.75" X 3" X 1.3"
Weight:	11oz (311g)
Operating Temperature Range:	-45° C to +60° C
Power Requirement:	
Voltage:	28.0 VDC ± 15%
Current:	75 mA minimum 150 mA maximum
Communication Protocol:	RS-232 38400,N,8,1
Panel Back Lighting:	28 VDC or 5VAC (specified when ordered)

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SECTION 2 – OPERATING INSTRUCTIONS

2.1 GENERAL

The RC-6000 is designed to be a secondary control point for the TDFM-600/6000 series of airborne transceivers. These instructions assume a working knowledge of the TDFM-600/6000. Operation of the RC-6000 is the same as operating the TDFM-600/6000 from its front panel except for a few differences covered below.

2.2 FRONT PANEL

Refer to the diagrams below:

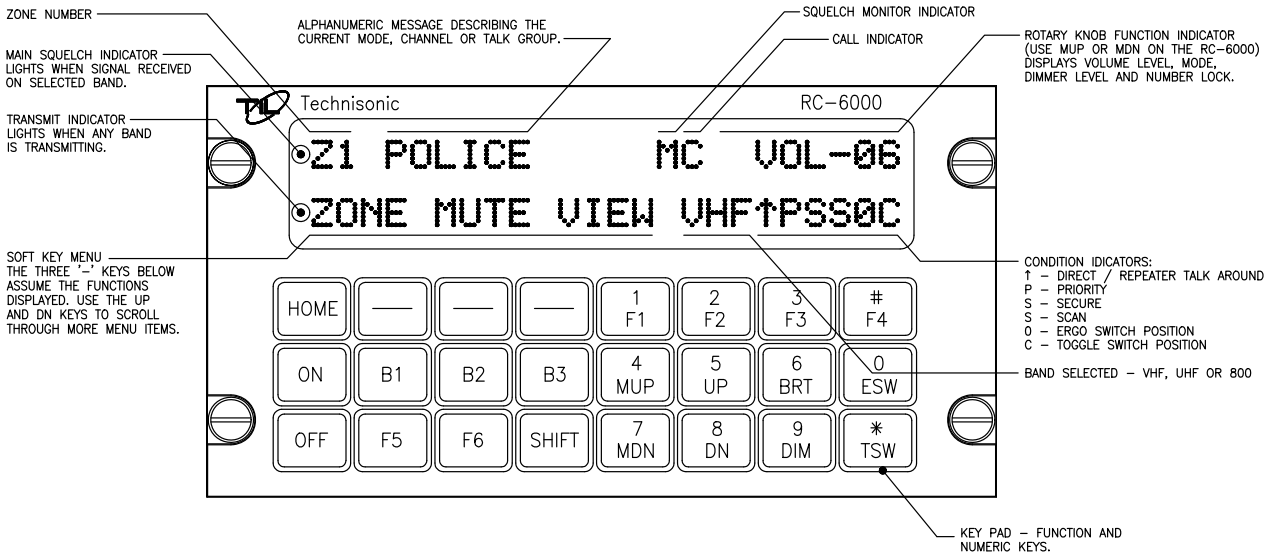


FIGURE 2-1 Front Panel Controls – RC-6000

2.3 POWER

The RC-6000 has an ON and an OFF button. Unlike the TDFM-600/6000 transceiver, you do not have to hold the OFF button as it will shut off immediately.

2.4 KNOBS

The RC-6000 does not have any rotary knobs since the volume function is not required. The volume at the remote headset would be adjusted at the remote audio panel.

2.5 BAND KEYS – B1, B2 B3

The RC-6000 has three keys which assume the function that the knob buttons have on the TDFM-600/6000. Pressing B2 for example, will change the display on both the radio and the remote to show band 2 information. Subsequent key presses will toggle through the following modes:

VOL – This will display the volume setting of the band selected. You can not change the setting but it is useful to see the setting in case the volume at the radio was inadvertently set to zero, etc.

CHAN – The current channel number will be displayed. Pressing MUP or MDN will scroll through the available channels.

DIM – The display brightness level will be shown for the RC-6000. The radio brightness level will be shown on its display. This is the only time that the RC-6000 display may be different than the TDFM-600/6000 display.

NUM LOCK – In this mode, the keys become number keys instead of their usual functions. This condition exists on both the remote and the transceiver.

2.6 FUNCTION KEYS

Function keys F1 through F4 operate the same as on the TDFM-600/6000 transceiver. F5 and F6 are for future development and have no function at this time.

2.7 SHIFT KEY

The shift key is also for future development.

2.8 DISPLAY

The RC-6000 has a two line, 48-character LED display which gives information about the selected band. On the top line is shown the zone number, channel name and rotary knob function. The bottom line displays the soft key menu, the band selected, and the ESW/TSW condition. Also displayed are letters and symbols indicating scan, direct/repeater talk around, monitor, secure, priority and call. In addition to the character display, there are two LED indicators on the left. The top LED indicates a signal is being received on the selected band while the bottom LED indicates that any one or more of the installed bands are transmitting. The display is always a direct copy of what is showing on the display of the radio except when editing the brightness setting.

2.9 GENERAL OPERATION

Switch on the RC-6000 by pressing the ON key. “TECHNISONIC” along with the firmware version will be displayed and then the self test. If the transceiver is already on, the normal screen will appear and the unit is ready to use. If the radio is off or is not connected, the display will show “CONNECTING.....” until the radio is detected. If the TDFM-600/6000 and RC-6000 are on the same power switch then the connecting message will be seen for a few seconds since the radio takes longer to start up. The RC-6000 operates like the radio except for the functions previously mentioned. In the case where the pilot and the remote operator select a function at the same time, the radio front panel has priority and therefore, the pilot has control. No special settings have to be changed on the TDFM-600/6000 in order for the remote to work nor does the radio care whether the remote is there. The remote does not have to be switched on for the radio to work.

SECTION 3 – INSTALLATION INSTRUCTIONS

3.1 GENERAL

This section contains information and instructions for the correct installation of the RC-6000 remote control.

3.2 EQUIPMENT PACKING LOG

Unpack the equipment and check for any damage that may have occurred during transit. Save the original shipping container for returns due to damage or warranty claims. Check that each item on the packing slip has been shipped in the container.

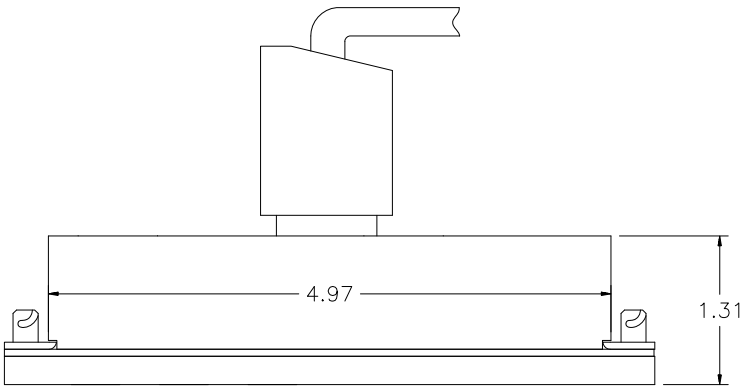
3.3 INSTALLATION

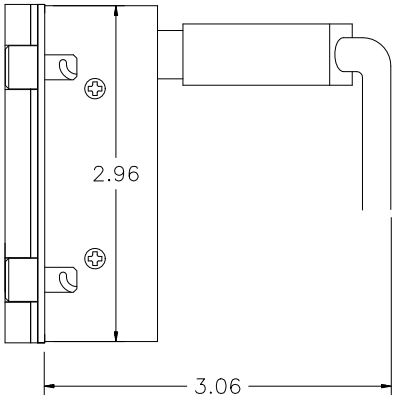
The RC-6000 Remote Control is designed to be DZUS mounted and should be installed in conjunction with an IN-RC6 installation kit. See figure 3-1 for an outline drawing of the unit with dimensions to facilitate the installation.

3.4 INSTALLATION KIT - CONTENTS

The IN-RC6 installation kit (P/N 029355-1) consists of:

1. One 9 pin Cannon D mating connector (female) complete with crimp pins and hood.





MINIMUM DISTANCE FROM REAR OF PANEL, TO END OF CONNECTORS INCLUDING CABLE CLEARANCE

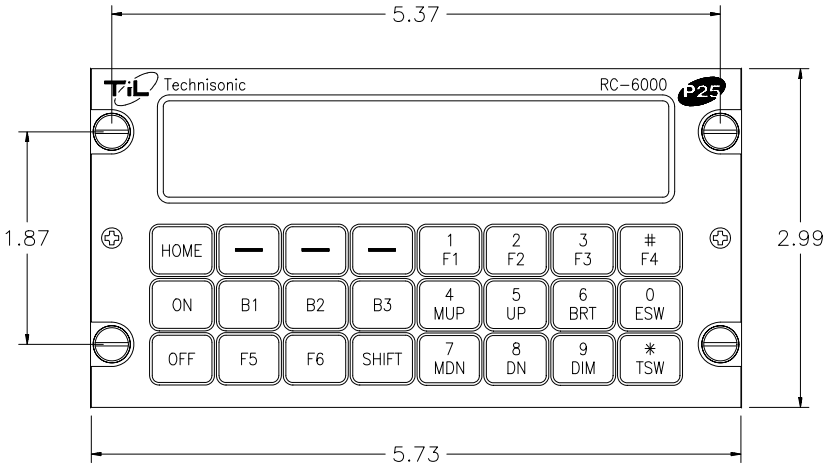


FIGURE 3-1 Outline Drawing for Model RC-6000

3.5. INSTALLATION – PIN LOCATIONS AND CONNECTIONS

J1 9-Pin D Connections - Use FEMALE-Connector	
Pin #	**Description**
1	Ground
2	Debug
3	Reset
4	+28 Volts DC
5	VCC
6	Backlight
7	RX Data
8	TX Data
9	No Connection

TABLE 3-1 Wire connections on a 9-Pin FEMALE D-Connector

3.6. INSTALLATION - WIRING INSTRUCTIONS

Figure 3-2 shows all required connections and recommended wire sizes for the RC-6000 Remote Control.

3.6.1 GROUND - PIN 1

Pin 1 should be connected to ground. The pin is internally connected to the chassis.

3.6.2 DEBUG - PIN 2

Do not connect. This pin is used for software updates at the factory.

3.6.3 RESET - PIN 3

Do not connect. This pin is also used for software updates at the factory.

3.6.4 +28 VOLTS DC - PIN 4

Connect to the 28 volt DC avionics bus through a 1 amp breaker.

3.6.5 VCC - PIN 5

Do not connect. This is a 5 volt output to supply the programmer for software updates at the factory. Output current is rated at 200 mA.

3.6.6 BACKLIGHT - PIN 6

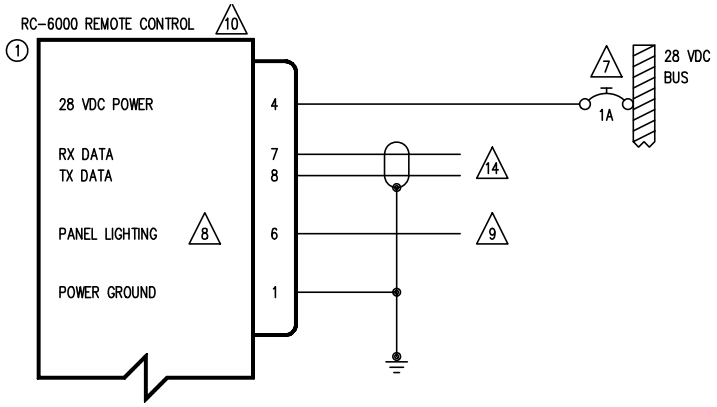
Connect to the aircraft dimmer bus. Backlighting is 28 volts DC unless otherwise ordered.

3.6.7 TX AND RX DATA - PINS 7 AND 8

These pins are to be connected to the RS-232 pins on the TDFM-600/6000. TX data connects to RX data on the radio and RX data from the remote goes to TX data on the radio.

3.6.8 NO CONNECTION - PIN 9

Do not connect this pin.



QTY	ITEM	PART NUMBER	DESCRIPTION	SPEC	MATERIAL
1	1	RC-6000	REMOTE CONTROL HEAD	TECHNISONIC INDUSTRIES LIMITED	
1	2	7274-11-1	CIRCUIT BREAKER, 1 AMP	KLIXON	

NOTES:
1) ALL WIRE IAW MIL-W-22759 UNLESS OTHERWISE SPECIFIED.
2) ALL CABLE IAW MIL-C-27500 UNLESS OTHERWISE SPECIFIED.
3) COAXIAL CABLE IAW MIL-C-17 UNLESS OTHERWISE SPECIFIED. DO NOT USE COAX WITH PVC INSULATION.
4) FABRICATION & INSTALLATION OF WIRING HARNESS IAW AC 43.13-1B CHAPTER 11.
5) GROUNDING AND BONDING IAW AC 43.13-1B CHAPTER 11, SECTION 15.
6) ALL WIRE TO BE #22 AWG MINIMUM, UNLESS OTHERWISE SPECIFIED.

7 AN EQUIVALENT CIRCUIT BREAKER OR FUSE MAY BE USED.

8 THE RC-6000 IS AVAILABLE WITH 28V OR 5V PANEL LIGHTING. CHECK THE CONFIGURATION CONTROL LABEL FOR THE CORRECT VOLTAGE.

9 CONNECT TO THE APPROPRIATE AIRCRAFT DIMMING BUSS.

10 INSTALLATION OF TRANSCEIVER IAW AC 43.13-1B CHAPTER 4, SECTION 4 AND AC 43.13-2A, CHAPTER 2. PR3 1/2 DZUS RAIL OR EQUIVALENT MAY BE USED.

11) TEST THE SYSTEM IN ACCORDANCE WITH THE POST-INSTALLATION TEST PROCEDURE IN THE INSTALLATION AND OPERATING INSTRUCTIONS MANUAL.

12) REFER TO THE AIRCRAFT STRUCTURAL REPAIR MANUAL AND THE MAINTENANCE MANUAL FOR INSTRUCTIONS AND INFORMATION PERTINENT TO THIS INSTALLATION.

13) THE USE OF RED DISPLAYS SHOULD BE MINIMIZED OR AVOIDED SO AS NOT TO DETRACT FROM THE ATTENTION GETTING CHARACTERISTICS NEEDED IN WARNING AND CAUTION ANNUNCIATORS. RED SHOULD BE USED TO ANNUNCIATE EMERGENCY CONDITIONS REQUIRING IMMEDIATE RESPONSE BY THE FLIGHT CREW. UNITS WITH RED DISPLAYS SHOULD NOT BE LOCATED IN CLOSE PROXIMITY TO WARNING AND CAUTION ANNUNCIATORS. THE INSTALLATION OF UNITS WITH RED DISPLAYS MUST BE EVALUATED ON A CASE BY CASE BASIS TO ENSURE THAT THE EFFECTIVENESS OF THE WARNING AND CAUTION ANNUNCIATORS IS NOT ADVERSELY AFFECTED.

14 TO BE CONNECTED TO THE RS-232 PORT ON THE TDFM-600/6000 TRANSCEIVER.

FIGURE 3-2 Wiring connections and notes for the RC-6000

APPENDIX TO INSTALLATION INSTRUCTIONS

3.7 POST INSTALLATION EMI TEST

3.7.1 PURPOSE

The purpose of this test is to identify any interference that the RC-6000 remote control head may cause with existing aircraft systems.

3.7.2 TEST CONDITIONS

The RC-6000 should be installed and function tested. The TDFM-6000 transceiver should be on throughout this test.

3.7.3 METHODOLOGY

Most of the EMI tests can be accomplished on the ground.

The GPS should be operational and navigating with at least the minimum compliment of satellites. The VHF comm should have the squelch open. VOR/DME receivers should be selected for display. If possible, set up a DME/Transponder ramp test set and adjust the output until the flags are out of view. The transponder and encoder should be monitored with ramp test equipment. Set the output of the transponder test set to 3db above the output necessary to achieve 90% reply. If possible set the ADF to a nearby navigation station.

Switch the RC-6000 on and off as often as required.

Observe the GPS for any degradation in satellite status or availability or flags. Listen for any noise or detected audio signals on the VHF comm(s). Listen for any noise or detected audio signals on the VOR/LOC receiver audio; look for any moment of flags or needles on the VOR/LOC/GS navigation display(s).

List the power plant, fuel and other electric instruments not already in the chart provided and note any anomalies that occur due to operation of the RC-6000. Assess the results.

If the aircraft is equipped with an autopilot or a stability augmentation system, then test fly the aircraft and verify that operation of the RC-6000 does not have adverse effects on these systems. After checking for gross effects at a safe altitude, fly a coupled ILS approach and look for any anomalies.

3.7.4 RESULTS

If the installed system passes all of the applicable EMI tests, then no further action is required. If interference is observed then the interference must be assessed against the appropriate standards of airworthiness for the system in question. A complete discussion of all the standards of airworthiness to be applied in assessing EMI effects is beyond the scope of this document.

3.7.5 PROCEDURE

List the power plant, fuel and other electric instruments not already included in the chart below and note any anomalies that occur due to operation of the RC-6000. Assess the results.

STEP	SYSTEM	PASS	FAIL	NOTES
1	Com 1&2			
2	Transponder & Encoder			
3	ADF 1 & 2			
4	VG			
5	Glideslope 1&2			
6	VOR/LOC 1&2			
7	Compass			

8	Directional Gyro			
9	Fuel Pressure			
10	Oil Temp			
11	Amps			
12	Bus Voltage			
13	Fuel %			
14	Ng			
15	TOT			
16	Torque %			
17	Ennunciators			
18	Digital Clock			

19	Oil Pressure			
20	DME 1&2			
21	GPS 1&2			
22	Autopilot			
23	Stability Augmentation Systems			
24	Coupled ILS Approach			

NOTES:

Technisonic Industries Limited
240 Traders Blvd., Mississauga, ON Canada L4Z 1W7
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IMPORTANT
WARRANTY

All communication equipment manufactured by Technisonic Industries Limited is warranted to be free of defects in Material or Workmanship under normal use for a period of one year from Date of Purchase by the end user.

Warranty will only apply to equipment installed by a factory approved and/or authorized facility in accordance with Technisonic published installation instructions. Equipment falling under the following is not covered by warranty:

- equipment that has been repaired or altered in any way as to affect performance,
- equipment that has been subject to improper installation,
- equipment that has been used for purposes other than intended,
- equipment that has been involved in any accident, fire, flood, immersion or subject to any other abuse.

Expressly excluded from this warranty are changes or charges relating to the removal and re-installation of equipment from the aircraft. Technisonic will repair or replace (at Technisonic's discretion) any defective transceiver (or part thereof) found to be faulty during the Warranty Period.

Faulty equipment must be returned to Technisonic (or its authorized Warranty Depot) with transportation charges prepaid. Repaired (or replacement) equipment will be returned to the customer with collect freight charges. If the failure of a transceiver occurs within the first 30 days of service, Technisonic will return the repaired or replacement equipment prepaid.

Technisonic reserves the right to make changes in design, or additions to, or improvements in its products without obligation to install such additions and improvements in equipment previously manufactured. This Warranty is in lieu of any and all other warranties express or implied, including any warranty of merchantability or fitness, and of all other obligations or liabilities on the part of Technisonic.

This Warranty shall not be transferable or assignable to any other persons, firms or corporations.

For warranty registration please complete the on-line Warranty Registration Form found at www.til.ca.